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Jack Gault

West Chester University of Pennsylvania, jgault@wcupa.edu

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**WHEN RETAILERS HAVE YOU BY THE NOSE:
THE INFLUENCE OF ENVIRONMENTAL FRAGRANCING
ON PATRON EVALUATIONS, PERCEPTIONS, & INTENTIONS**

John E. (Jack) Gault, West Chester University of Pennsylvania
Jgault@wcupa.edu

ABSTRACT

Casino operators have long known that the longer players gamble, the larger the house's take. Similarly, extending the amount of time other retail patrons shop may increase their opportunity for spending. Atmospheric research suggests that manipulating ambient scent may influence the length of time customers remain on the premises. Moreover, since scent knows no language barriers, the global implications of harnessing the power of environmental fragrancing are enormous. Consistently predicting the direction and magnitude of scent-induced effects, has however, proved quite difficult. Employing scent for strategic advantage is therefore deemed somewhat risky. This study aims to reduce the risk by increasing our understanding of how, and under what circumstances environmentally induced feeling states may lead to increased shopping time and other desired outcomes. A laboratory experiment tested affective state induction under situations of low and high involvement, and the transfer of these feeling states to the enjoyment of, and willingness to remain in, an environmental setting. Results indicate involvement and scent pleasantness matter most. Theoretical and managerial implications are discussed.

INTRODUCTION

Environmental Influences on Behavior

The idea that people respond emotionally to their immediate surroundings is widely accepted in psychology (Machleit & Eroglu, 2000). The environments in which consumers shop, eat, and play, may therefore arouse emotions and moods, and these induced feelings can, in turn, influence consumer attitudes and behaviors (Barnes and Ward 1995; Gardner 1985). Although retailers have at least implicitly understood these relationships for decades, there has been little scientific research into the effects of store environments on shopper emotions (Bagozzi et. al., 1999), attitudes and/or behaviors (Turley & Milliman, 2000). Improving our understanding of retail atmospherics offers two immediate benefits for global retail marketers. First, since store choice often precedes brand choice (Darden, 1983), improving our ability to manipulate the store environment offers a potentially powerful marketing tool to differentiate a retailer from its competitors (Kotler, 1973). Second, since many purchase decisions are made within the store (Keller, 1987), retail atmospherics offers a potent influence on point-of-purchase consumptive behavior. Yet, despite these implications for influencing consumer decisions, many marketers continue to rely mainly on traditional research paradigms, which focus on verbally processed stimuli, ignoring the many non-verbal aspects (Holbrook & Hirschman, 1982). Additional scientific research of non-verbal sensorial cues is needed, as these stimuli have been shown to play an important role in the induction of feelings, which in turn may be linked to buyer attitude, preference, and behavior (Belizzi & Hite, 1992). One non-verbal element of the environment of particular interest for studies of consumptive behavior is scent. While scent has long been regarded

as a very powerful and enduring sense, attempting to harness its power has been rather elusive. A general lack of understanding of the underlying dimensions of scent has impeded our ability to predict behavioral and other induced effects at point-of-purchase. A multidisciplinary approach, which includes not only retail atmospherics, but also research from environmental psychology and olfactory science, offers fresh insights on eliciting desired scent induced outcomes.

Olfactory Influences on Behavior

Physiologically, our sense of smell is directly connected to the brain's limbic system, the center of all of our emotions (Serby & Chobor, 1992). Our olfactory sense has therefore often been described as our most emotional sense (Benderly, 1988). Marketing investigations of olfactory effects on consumption have primarily involved scent in two forms—scented objects and ambient scent (Gulas, 1994). Marketers have conducted a few studies of ambient scent effects, either related or unrelated to the products being sold (Miller, 1993). Recent investigations of scent effects on retail shopping behavior have found significant relationships between induced affective states and perceptions of the store and its product content (e.g., Spangenberg et al., 1996, Mattila & Wirtz, 2001), time spent in the store (Kellaris & Kent, 1992), and propensity to make a decision, and satisfaction with the shopping experience (e.g., Dawson et al., 1990; Sherman et al., 1997). There have, however, been inconsistencies in demonstrating scent effects. For example, Spangenberg et al., (1996) found only one of three product evaluations was significantly affected by ambient scent. Yalch and Spangenberg (2000) suggested that with few exceptions, (e.g., Hui & Bateson, 1991; Dube et al., 1995) a possible cause is that few experimental studies investigate the underlying emotional states of pleasure, arousal, and dominance. Donovan and Rossiter (1982) postulated these “PAD” variables as factors mediating the effect of store environment on shopping behavior. The current study will address these inconsistencies and gap in the extant literature.

Purpose of the Research

To help remedy omitted or conflicting empirical observations in the existing literature, an interdisciplinary framework is developed to enhance our understanding of atmospherics. As Machleit and Eroglu (2000) suggest, there are three models from environmental psychology, which hold interest for marketers interested in assessing induced emotional response. These models include: Izard's (1977) ten fundamental emotions, Plutchik's (1980) eight basic emotion categories, and Mehrabian and Russell's (1974) Pleasure, Arousal, and Dominance (“PAD”) dimensions of emotional response. The Mehrabian and Russell PAD scale is regarded as preeminent in the field of environmental psychology (Machleit & Eroglu, 2000). There have however been a few recent challenges to the M-R model's pre-eminence. For example, Machleit and Eroglu (2000) found the Plutchik measure explained more variance in shopping than the PAD scale, although Havlena and Holbrook (1986) found the reverse to be the case when assessing consumptive behavior. In a test of competing models, Chebat and Michon (2003) found Lazarus's (1991) Cognitive Theory of Emotions better described their outcome than Mehrabian and Russell's PAD variables. They further concluded that rather than experiencing a mood shift, shoppers simply transferred the pleasantness/unpleasantness of the scent to the object. The Chebat-Michon study incorporated the (same) citrus scent used by Spangenberg et al. (1996)—a commercially available “combination of orange, lemon and grape” (Chebat & Michon 2003, p. 534). They found that while that scent was arousing, it provided little induction of pleasure or mood (Chebat & Michon 2003, p. 534) and supported their hypothesis (H1a) that a “light and pleasant scent arouses consumer” (Chebat-Michon, 2003, p. 533). The current study demonstrates that not all light and pleasant scents are created equal, and that while one will induce arousal, another is just as likely to

induce a relaxed state. As Warrenburg (1999) suggests, an improved taxonomy to describe scents is needed. The taxonomy might include a scent’s underlying hedonic (pleasant), activation (arousal), and mood dimensions. The current study pre-tested various pure (unblended) scents, known among olfactory experts to induce affective states that were either pleasant and arousing, or pleasant and relaxing, or unpleasant and arousing. To demonstrate the link between a scent’s underlying dimensions and its resultant induced affective state, the current study extends earlier atmospheric theory (e.g., Kotler, 1973; Bitner, 1992; Gulas & Bloch, 1995). Specifically this study tests an expanded version of the basic M-R Stimulus-Organism-Response (S-O-R) model (Figure I) by incorporating both situational moderators and interactive effects (Figure II).

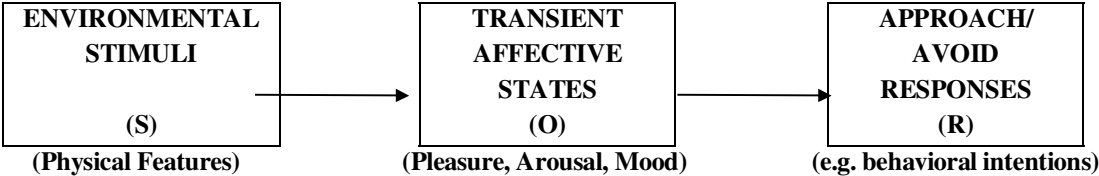


FIGURE I. THE BASIC S-O-R MODEL

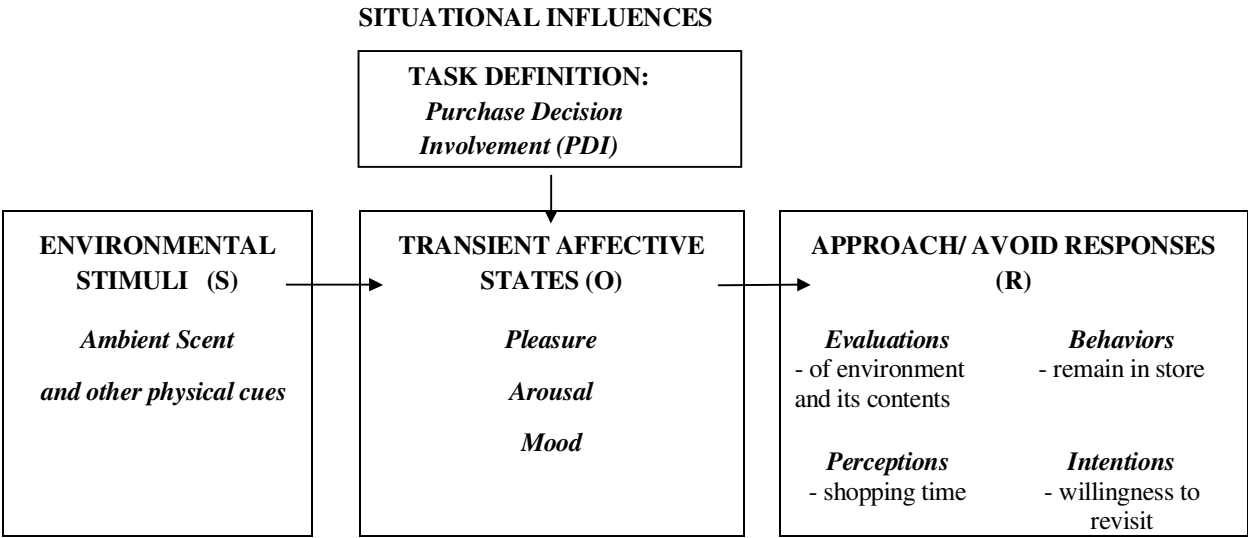


FIGURE II. PROPOSED MODEL OF SITUATIONAL INFLUENCES ON RETAIL SHOPPER RESPONSES

In the basic M-R model, environmental stimuli (S) induce affective states (O), which in turn mediate approach-avoidance responses (R). The M-R model offers a theoretically sound foundation for developing our understanding the effects of ambient scent and other environmental influences on consumer behavior. Earlier atmospheric researchers have also adapted this M-R mediational framework of affective transfer to retail settings (e.g., Russell & Pratt, 1980, Donovan & Rossiter, 1982, 1994; Spangenberg, 1996). Russell and Pratt (1980) adapted the M-R framework by operationalizing stimuli (S) as physical features of the retail environment, and willingness to buy as the approach-avoidance response (R). Environmentally induced affective states have been found to influence consumer evaluations including assessments of the environment and objects in the store (e.g., products, sales people). However, inconsistencies in the findings suggest the need

for additional theory development (Spangenberg, 1996). For example, Spangenberg et al. (1996) found that positive affective state induction utilizing pleasant scents resulted in increased levels of positive evaluations of a backpack, but not of a calendar. Spangenberg theorized that the impact of scent on specific product evaluations might have been moderated by attitude toward the product (1996, p. 75). He suggests that the backpack evaluations improved because it was a less-liked product to begin with, versus the calendar, which was much more highly evaluated in the unscented condition. Similarly, Spangenberg found that purchase intentions improved significantly for the backpack in the pleasantly scented condition, but not so for the calendar. He suggested that purchase intentions might not improve significantly for products to which consumers are already favorably disposed (1996, p. 76). Finally, Spangenberg suggested that the inclusion of offensive (negative) scents would provide an interesting comparison, as his study included only affectively pleasant and affectively neutral scents. He also found no difference in store evaluations under either of these two conditions.

As shown in Figure II, and as the olfactory science literature suggests (e.g., Cain, 1978, 1982, 1988; Doty, 1981, 1985, 1991), a scent's hedonic (pleasure-displeasure) quality and activating (arousal-sleepy) dimensions should be assessed for their separate and interactive influences on affective transfer. As a result, the current study examines the manner and degree to which an ambient scent's hedonic and activation dimensions influence shoppers' approach-avoidance responses. The study also includes the interaction of affective transfer and mood. As mood research (Gardner, 1984, 1985; Gardner & Siomkos, 1985; Ger, 1986) indicates that mood may play an important role in modeling affective transfer. According to Bone and Ellen (1999), mood effects are likely to parallel the hedonicity of the odor (i.e., pleasant odors leading to pleasant mood states, and unpleasant odors leading to unpleasant moods). Approach-avoidance responses in the proposed model are therefore operationalized to include positive-negative evaluations of the environment, and perceptions of time spent in the environment.

As suggested by Spangenberg (1996), and unique to the current study is the incorporation of a negative (unpleasant) scent. As he and other atmospheric researchers indicate, it is important to understand consumer reactions to negative as well as positive affective dimensions (Babin & Attaway, 2000). Additionally, the current model incorporates situational influences. Research on attitude change and persuasion (Petty & Cacioppo, 1986) and on involvement in attitude change (Petty, Cacioppo, & Schuman, 1983) and on situational research (Belk, 1974, 1975, 1984) suggests that situational influences may moderate the relationship between environmental stimuli and consumer responses. Belk's (1974, 1975) environmental situational factors are included as potential moderators of the effects of ambient scent on shopper responses. Belk's five situational factor categories include (1) *physical surroundings* (e.g., physical environmental stimuli), (2) *antecedent states* (e.g., transient affective states), (3) *task definition* (e.g., purchase decision involvement), (4) *temporal perspective* (i.e., time dimension), and (5) *social surroundings* (e.g., other people present). The proposed model incorporates and tests the first four of Belk's situational variables and includes environmental stimuli, transient affective states, and purchase decision involvement (PDI) as independent variables. Perceived shopping time is also among the dependent responses tested. The current study also controls for the situational influence of social surroundings (Belk's fifth variable), and for other non-situational influences such as gender and age. In summary, the proposed expanded model aims to refine our understanding of the effects of the physical dimensions of ambient scent by decomposing scent into its underlying activation and hedonic dimensions, and by incorporating situational influence as a key moderator of affective transfer. Several hypotheses are tested within this model.

HYPOTHESES

The Moderating Influence of Involvement

The influence of induced affective states (pleasure, arousal and mood) on shopper responses (evaluations, perceptions and intentions) is thought to be moderated by situational factors such as purchase decision involvement. The Elaboration Likelihood (ELM) Model (Petty & Cacioppo, 1986; Petty, Cacioppo & Schuman, 1983) states that affective influences dominate cognitive influences in situations requiring little or no elaboration. Retail atmospherics research by Baker (2002, 1987) suggested cognitively processed cues are dominant over ambient cues, which affect the subconscious. Ambient cue effects may therefore be diminished or nullified depending on the degree of competition from cognitively processed cues. Baker's research corroborates ELM theory, which indicates low-level processing for peripheral cues. Mazursky and Ganzach (1998) found if involvement was delayed (i.e., not induced before or concurrently with information acquisition), positive affective transfer could occur under situations of low and high involvement.

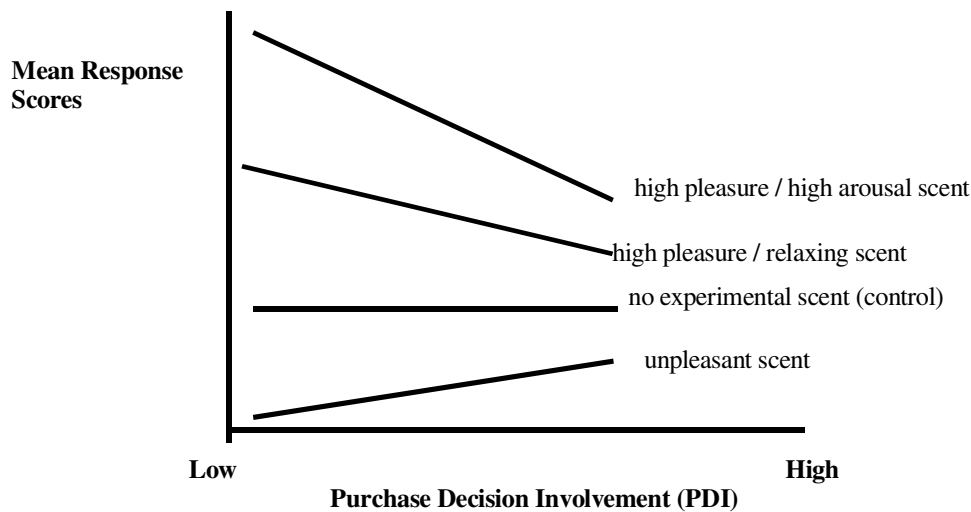


FIGURE III. PDI AS A MODERATOR OF THE RELATIONSHIP BETWEEN SCENT HEDONICS AND SHOPPER RESPONSES

As illustrated in Figure III, the study proposes that peripheral scent cues have greater influence on shopper responses in situations of low rather than high purchase PDI, and that arousal plays a role in this relationship. Arousal theory states that arousal intensifies other affective feeling states (Gilligan & Bower, 1984). And in the context of atmospheric research, suggests that increased arousal may intensify subjects' evaluations of an environment and its contents (Russell & Pratt, 1980). Olfactory researchers Ludvigson and Rottman (1989) found scents low in activation (arousal) properties induced a relaxing effect. Therefore Russell and Pratt's (1980) proposition that arousal intensifies evaluations may be tested by comparing the effects of a pleasant and highly arousing ambient scent, to one that is pleasant and relaxing. Together, ELM and arousal theory suggest an increase in positive responses to pleasant and arousing ambient scents vs. the no experimental scent (control) in situations of low rather than high PDI. The response effects of pleasant/relaxing ambient scent are expected to lie somewhere between those of pleasant/arousing ambient scent, and the control condition. The moderating influence of PDI on the relationship between ambient scent pleasantness/arousal and shopper responses result in five hypotheses:

- *induction of affective feeling states*, including pleasure (H1), arousal (H2), mood (H3)
- *evaluation of the surrounding environment* (H4)
- *perception of time* (H5)

Induction of Affective Feeling States

Induced Pleasure (H1).

There is a growing body of research indicating an affective dimension to scent. The odor experience has been described as naturally hedonic (Ehrlichman & Halpern, 1988) and empirical evidence provides support for scent based affective responses (Ludvigson & Rottman, 1989). The presence of pleasant ambient scent is expected to result in elevated states of mood and pleasure in comparison to conditions of no-experimental ambient scent or unpleasant ambient scent:

- β H1a: Self reported pleasure is higher in the presence of pleasant ambient scents than in the no-experimental scent condition under conditions of low rather than high PDI.
- β H1b: Self-reported pleasure is higher in the presence of pleasant/arousing ambient scent than in the presence of pleasant/relaxing scent under conditions of low rather than high PDI.
- β H1c: Self-reported pleasure is lower in the presence of unpleasant ambient scent than in the no-experimental scent under conditions of low rather than high PDI.

Induced Arousal (H2).

Research in olfactory science demonstrates physiologically that odors differ in their ability to elicit hedonic (pleasure) and arousal responses according to their capacity to stimulate the olfactory bulb and/or trigeminal nerves respectively (Serby & Chobor, 1992). For example, lavender scent may elicit a hedonic pleasure response while simultaneously inducing a relaxing effect (Ludvigson, 1989). Peppermint has been shown to elicit a pleasant hedonic reaction while also elevating arousal. Psychology researchers Shock and Coombs (1937) found that both pleasant and unpleasant experimental odors were capable of eliciting higher levels of arousal than no experimental odor. Taken together, these findings from olfactory science and environmental psychology suggest the following four arousal related hypotheses:

- β H2a: Self-reported arousal is higher in the presence of pleasant/arousing ambient scents than in the no-experimental scent control under condition of low rather than high involvement.
- β H2b: Self reported arousal is higher in the presence of pleasant/arousing ambient scent than for pleasant/relaxing scent under conditions of low rather than high PDI.
- β H2c: Self reported arousal is higher in the presence of unpleasant/arousing ambient scent than in no experimental scent control under conditions of low rather than high PDI.
- β H2d: Self-reported arousal is lower in the presence of pleasant/relaxing ambient scent than in no experimental scent control under conditions of low rather than high PDI.

Induced Mood (H3).

Since pleasure and arousal are considered sub-components of overall mood and the effects of scent, pleasantness and arousal on mood are hypothesized to be in the same direction as for pleasure and arousal (Gardner, 1985):

- β H3a: Self reported mood is higher in the presence of pleasant ambient scents than in the no-experimental scent under condition of low rather than high involvement.
- β H3b: Self reported mood is higher in the presence of pleasant/arousing ambient scent than for pleasant/relaxing scent under conditions of low rather than high PDI.
- β H3c: Self-reported mood is lower in the presence of unpleasant ambient scent than in the no-experimental scent control for conditions of low rather than high PDI.

Evaluation of the Surrounding Environment (H4).

Eaton (1989) proposed that cues in the environment aid individuals in making inferences concerning environmental contents. The mechanism by which this inference occurs has been described as affective transfer (Mehrabian & Russell, 1974; Russell & Pratt, 1980). Store image research suggests that retail store atmosphere is comprised of aural, visual, tactile, and olfactory elements (Kotler, 1973; Mazursky & Jacoby, 1986; Baker, 1994). In accordance with ELM and arousal theories, the introduction of a more pleasant and/or pleasantly arousing olfactory condition should yield a more positive evaluation of the store environment under conditions of low, rather than high purchase decision involvement:

- β H4a: Evaluations of the surrounding environment are higher in the presence of pleasant ambient scents than in the no-experimental scent condition under conditions of low rather than high PDI.
- β H4b: Evaluations of the surrounding environment are higher in the presence of pleasant/arousing ambient scent than in the presence of pleasant/relaxing scent under conditions of low rather than high PDI.

Conversely, the introduction of an unpleasant ambient scent is expected to lead to a more negative evaluation of the surrounding environment under low PDI conditions:

- β H4c: Evaluations of the surrounding environment are lower in the presence of unpleasant ambient scent than in the no-experimental scent (control) under conditions of low rather than high PDI.

Evaluation of Perceived Time (H5).

Regarding subjects' temporal perspective (perception of time), Spangenberg (1996) found that exposure to a pleasant ambient scent caused shoppers to perceive that they spent less time shopping than had actually elapsed. The current study re-tests the temporal effect of pleasant scent on perceived time, and introduces two additional propositions: (1) that the opposite effect occurs in the presence of unpleasant ambient scent (i.e., perceived time is greater than actual time), and (2) that the perception of time is also influenced by arousal and involvement levels. Donovan and Rossiter (1982) for example, found that arousal, or store-induced feelings of alertness and excitement, increased the time subjects spent in the store and increased their willingness to interact with store personnel. These findings combined with ELM theory discussed previously, suggest that the hypothesized effects are expected to intensify under conditions of low rather than high PDI. Therefore, in the current study, for a given level of scent pleasantness, increasing arousal is hypothesized to increase perceived time as a percentage of actual time:

- β H5a: Perceived time is less than actual time in the presence of pleasant ambient scent when purchase decision involvement is low rather than high.
- β H5b: Perceived time is a greater percentage of actual time for pleasant/high arousing scents than for pleasant/relaxing scents when purchase decision involvement is low rather than high.

Conversely, decreasing the level of arousal in the presence of unpleasant ambient scent is expected to increase perceived time as a percentage of actual time:

- β H5c: Perceived time is greater than actual time in the presence of unpleasant ambient scent when purchase decision involvement is low rather than high.

In summary, the hypotheses test the effects of an ambient scent's underlying physical stimulus dimensions (i.e., pleasantness, arousal, and mood inducing qualities) on affective feeling state induction and subsequent affective transfer to a shopper's responses (i.e., evaluations, intentions, and perceptions). Also examined is the moderating influence of situational changes in purchase decision involvement (PDI) on this relationship. The next section describes the methodology used to test the hypotheses, including the sample, scent stimuli, products, and PDI manipulation.

METHODOLOGY

Overview

A laboratory experiment was disguised as a shopper survey. A between subjects factorial design tested for the main effects of ambient scent on shopper responses, the mediating influence of affective state, and the moderating influence of purchase decision involvement (PDI). Subjects in all eight cells evaluated the same set of products within the same laboratory setting. Each of the eight subject cells in the main study was exposed to only one of the four levels of ambient scent and one of two levels of PDI (Figure IV). Proven pencil and paper instruments were used to evaluate products and the environment, to assess self-reported feeling states of mood, pleasure and arousal, to assess subjects' perception of shopping time, and to measure purchase intent and degree of liking. Univariate comparisons were made for individual response measures, and the analysis of results for each subcategory of dependent shopper responses was reported as MANOVA overall F-tests to control for Type I error. The moderating influence of PDI was represented as the interaction of PDI and Scent Condition in ANOVA and MANOVA analysis. A detailed explanation of the research design, procedures, and statistical analysis employed follows.

Between Subjects Factor	Pleasant/ Arousing Scent		Pleasant/ Less- Arousing Scent		Unpleasant/ Scent		No-Scent Control	
Between Subjects Factor	<i>High PDI</i>	<i>Low PDI</i>	<i>High PDI</i>	<i>Low PDI</i>	<i>High PDI</i>	<i>Low PDI</i>	<i>High PDI</i>	<i>Low PDI</i>
Cell #	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>

FIGURE IV. FACTORIAL DESIGN: FOUR SCENT CONDITIONS BY TWO INVOLVEMENT LEVELS

An on-campus shopper survey provided the disguise for the true purpose of the experiment. PDI was manipulated by varying the shopping scenario including the survey facilitator, shopping instructions, and cover story. The between-subjects design proved superior in preventing hypothesis guessing even in the presence of very noticeable levels of ambient scent. For example, for cells in which any subject(s) mentioned the presence of an odor when entering the facility, survey facilitators quickly deflected the comment by mentioning that the carpet and flooring had just been cleaned. The presence of “Wet Floor” markers aided in disguising the true purpose of the experiment. This method of disinformation would not likely work more than once with each subject cell. A within subjects design is, therefore, unsuited and would likely result in a considerable amount of hypothesis guessing. Additionally, repeated testing of the same subjects in a within-subjects design would also be more susceptible to collaboration among respondents. A longitudinal within-subjects design, particularly one relying on voluntary participation, may result in several subjects missing one or more sessions causing numerous gaps in the data set. Some subjects might even drop out of the study altogether. The 4 x 2 cross sectional between-subjects factorial design significantly reduced or eliminated all of these threats to internal validity.

Subjects

Pre-testing and the main study were conducted on the campus of a mid-size northeastern state university of 13,000 students and a total of 689 students participated. To prevent collaboration among subjects, participants in the pretests were from different majors and campus locations.

Setting

A modern on-campus focus group facility served as the site for the main study. The site was equipped for videotaping, allowing enhanced review of all cells. Moreover, the facility afforded control over scent levels and other atmospheric elements as was equipped with its own ventilation system and controllable sources of lighting (fluorescent, incandescent, and natural).

Cover Story and Shopping Instructions

The cover story and shopping instructions were varied to achieve low and high levels of purchase decision involvement. A research assistant greeted subjects as they entered the test facility. To avoid introducing any unwanted olfactory stimuli, the assistant was asked not to wear any perfume or other scented cosmetic. Subjects were also instructed not to bring any food or drink into the facility. Upon entering the focus group room, a brief description of the facility was provided to facilitate the cover story, and ensure that subjects in the odorized cells had a few minutes to react to the ambient scent. Next, an overhead presentation provided instructions and informed participants they would be evaluating a set of products by writing their individual evaluation responses in a booklet. The (disguised) purpose of the research was then presented and the cover story, shopping instructions, and moderator were varied to achieve the desired PDI level.

High PDI Cover Story

A professor conveyed the survey cover story was that a new type of vending machine was about to be test marketed on college campuses. The machines would accept debit cards in addition to cash, and offer non-food, non-tobacco, and non-beverage items. Subjects were told they would be helping to determine the products to be sold on their campus in the very near future. They were also told that client observers were viewing them from behind the one-way mirror. The research

facilitator also made explicit references to the audio and videotaping capabilities of the facility, pointing out the microphones located in the ceiling. A “Clients Only” sign was posted on the closed door of the client observation room. The facilitator also purposely made a few comments to clients (who were actually colleagues) in the observation room to enhance the disguise.

Low PDI Cover Story

An undergraduate research assistant briefed the subjects that a vendor of school supplies was interested in marketing its product line to college students in neighboring states. Subjects were advised that any future test market would occur out-of-state and the products would be unavailable on their own campus for two years. No mention was made of any new type vending machines. The door to the client observation room was left open, and S’s were told no clients would be arriving anytime that day.

High PDI Shopping Instructions

Subjects were asked to *carefully examine* the products as if it was a week before the school year and they were actively shopping for supplies. Products evaluated included plastic ballpoint pens, 22-karat plated ballpoint pens, mechanical pencils, and compact data storage diskettes.

Low PDI Shopping Instructions

Subjects were instructed to shop as if they were *casually browsing*, with no particular need for any of the four products and not to spend too much time dwelling on (their) responses.

STATISTICAL MODELS

Modeling Affective Induction and Transfer

Principal Components (PC) data reduction analysis with an orthogonal rotation was used to assess the effects of ambient scent on the induction of affective states of pleasure, arousal, and mood, and on subsequent affective state transfer to feelings about the environment and its contents. Sixteen scale items comprised the self-reported affective states of pleasure, arousal, and mood, including Mehrabian and Russell’s (1974) pleasure and arousal scales at six items each were combined with Peterson and Sauber’s (1983) four-item Mood Short Form (MSF) scale. Research suggests pleasure and arousal are orthogonal and described by separate independent factors (Mehrabian & Russell, 1974; Russell & Pratt, 1980; Crowley, 1993; Spangenberg et. al., 1996). Research on the effects of mood in general (Gardner, 1985), and ambient scent on mood (Knasko, 1992a, 1992b; Spangenberg, 1996; Bone & Ellen, 1999) suggests that the effects of ambient scent on mood may be subtle at best, yielding the smallest factor in a three-factor solution (i.e., smallest Eigen value).

Modeling Purchase Decision Involvement (PDI)

To test the hypothesized moderating interaction of PDI and scent on shopper responses, multivariate analysis of variance (MANOVA) was among the statistical techniques utilized. MANOVA is appropriate since the experiment tests the effects of two independent factors (ambient scent and PDI) on two dependent variables (evaluations of the environment and perceived time) that are believed to be related. Using MANOVA is also preferred because it is a more powerful test, which controls for the type I experiment-wide error rate associated with using multiple ANOVAs. If MANOVA detects a significant difference, post hoc testing will be

employed to determine which of the dependent groups contributed to the overall difference. Bonferroni's test of inequality will be used when comparing more than two groups to control for the inflation of Type I error rate (e.g., testing effects among the four scent treatments). Separate univariate tests may also be used to further examine individual variables (e.g., if and to what degree an individual scale item contributed to an overall significant difference of measures).

ANALYSIS & RESULTS

Scent Selection

Pre-testing corroborated expert opinion as Clementine and Vanilla scents surfaced as those, which best induced the desired combinations of pleasant/arousing, and pleasant/relaxing feelings respectively. Galbanum was the only unpleasant tested because unlike most other malodorous substances available, it is completely non-toxic. Pre-testing confirmed galbanum elicited the intended unpleasant/arousing response.

Affective State Induction

Analysis of variance and t-testing indicated that both PDI and scent pleasantness were successfully manipulated to the degree and direction desired (Figure V).

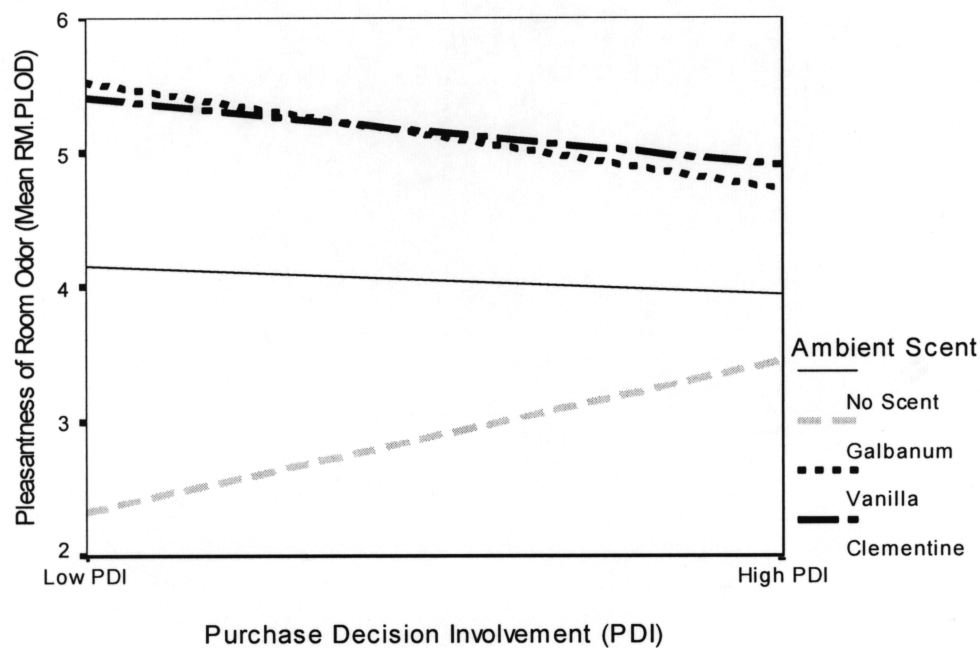


FIGURE V. PERCEIVED ROOM ODOR PLEASANTNESS (4 SCENTS X 2 PDI'S)

MANOVA analysis indicated a significant effect of scent on perceived room pleasantness ($p=.000$), and a significant interactive effect of PDI by scent on room odor pleasantness ($p=.000$). Bonferroni comparisons of room odor pleasantness by scent for both low and high PDI treatment levels support ELM theory in that the peripheral scent cues were more attended to under conditions of low rather than high involvement. Specifically, there was a significant difference in perceived odor pleasantness between the pleasant scent treatments and the no scent control for low PDI only.

Under the high PDI condition, a significant difference was detected only when comparing the extreme situational differences of subjects exposed to a very pleasant scent, to those exposed to a very unpleasant scent. Bonferroni comparisons between scents under low and high PDI reveal that the effects of ambient scent hedonic and activation dimensions on perception of room odor pleasantness may result in significant support for hypotheses H#a and H#c in each of the first three hypotheses tested. For example, perceived room odor pleasantness varied under low PDI to the degree and in the direction needed to support H1a and H1c, but not H1b:

- β H1a: Pleasant Scent Environmental Evaluations > No Scent Enviro. Evaluations – supported
- β H1b: Pleasant/Arousing Scent Evaluations > Pleasant/Relaxing Scent Evaluations (i.e., Clementine > Vanilla) – Not supported
- β H1c: Unpleasant Scent Evaluations < No Scent Evaluations – supported

MANOVA and ANOVA analyses results summarized in Table I indicate there was no discernable interactive effect of arousal—arousal simply did not intensify pleasure as hypothesized. Subjects exposed to the pleasant/arousing Clementine scent reported feeling states of pleasure, arousal, and mood, which were not significantly different from subjects exposed to pleasant/relaxing Vanilla . The successful manipulation of room odor pleasantness in this controlled experiment does provide evidence that affective state induction was due to exposure to ambient scent.

TABLE I. RESULTS OF HYPOTHESEIS TESTING OF AFFECTIVE STATE INDUCTION

<i>Hypothesized Induction of Affective State</i>	Hypothesized vs. Observed Scent Comparison		
	<i>H(#)^a</i>	<i>H(#)^b</i>	<i>H(#)^c</i>
	<i>pleasant scent > no scent</i>	<i>pleasant/arousing > pleasant relaxing</i>	<i>unpleasant/arousing < no scent</i>
H(1) <u>Induced Pleasure</u> (scale -24 to +24)	Clementine 16.55 > 5.90*** Vanilla 15.98 > 5.90**	n.s.	Galbanum -.86 < 5.90*
H(3) <u>Induced Mood</u> (scale 5 to 20)	Clementine 16.55 > 13.23*** Vanilla 15.98 > 13.23**	n.s.	Galbanum -.86 < 5.90*
	<i>pleasant scent > no scent</i>	<i>pleasant/arousing > pleasant relaxing</i>	<i>unpleasant/arousing > no scent</i>
H(2) <u>Induced Arousal</u> (scale -24 to +24)	Clementine: 7.32 > 0.15** Vanilla: -6.34 > 0.15*	Clementine 7.32 > Vanilla -6.34 ***	Galbanum 7.70 > 15**

* $p < .05$; ** $p < .01$; *** $p < .001$; n.s. = not significant

As hypothesized, a significant interactive effect existed between scent and PDI, such that pleasure, arousal, and mood states each differed significantly between scents when under conditions of low rather than high PDI. Low PDI subjects reported more positive/negative feeling states, and higher/lower evolutions of their physical surroundings, when exposed to pleasant/unpleasant scents, than those in the no-experimental scent condition. Again, pleasure and arousal dimensions were found not to interact, with those exposed to pleasant/arousing scent provide evaluations of the environment not significantly different from those exposed to the pleasant/relaxing scent treatment. If the evaluation outcomes were so similar, perhaps the underlying mechanisms were not different.

Principal Components Analysis of Affective States

Principal Components (PC) analysis was conducted of all 16 affective state scale items simultaneously (six pleasure, six arousal, and four mood items) to ensure that pleasure and arousal were elicited as intended. The results confirmed that pleasure, arousal, and mood loaded as orthogonal (independent) factors, and in the order predicted. Pleasure accounted for a dominant 48.8% of overall affective state loading, arousal for 23.9%, and mood a subtle but significant 6%. Factors 1 and 2 therefore corroborate the Mehrabian and Russell (1974) assertion that pleasure and arousal are prime affective dimensions, and that mood is at best a distant third. Statistical assumptions were met as Kaiser-Meyer-Olkin's measure of sampling adequacy was confirmed at .912, and Bartlett's Test of Sphericity found significant at the .000 level. Additional statistical analysis corroborated the intended manipulations of low/high PDI and pleasant/unpleasant scent. A resulting scree plot (Figure VI) illustrates the three-factor solution, with subsequent factors in the tail adding much less explanation of variance.

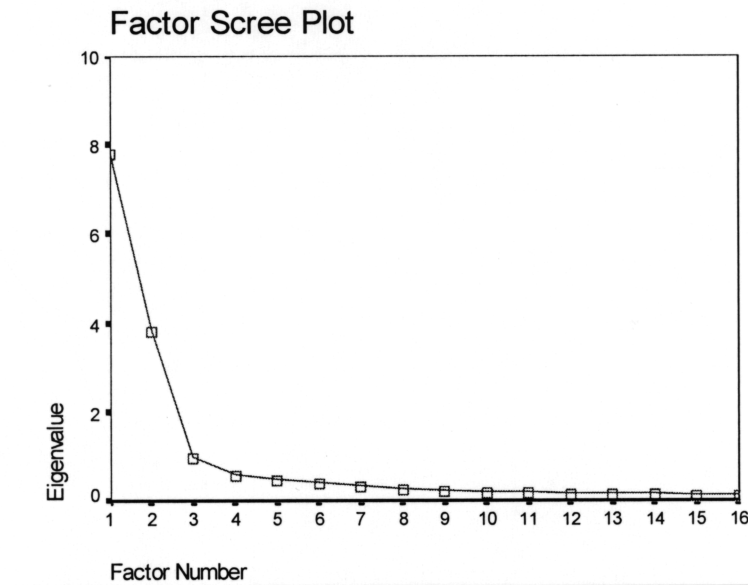


FIGURE VI. SCREE PLOT OF 16 FISHER SCALE ITEMS

By plotting the factor matrix in rotated space (Figure VII), we confirm pleasure, arousal, and mood as independent orthogonal dimensions (Mehrabian & Russell, 1974; Russell & Pratt, 1980).

Factor Plot in Rotated Factor Space

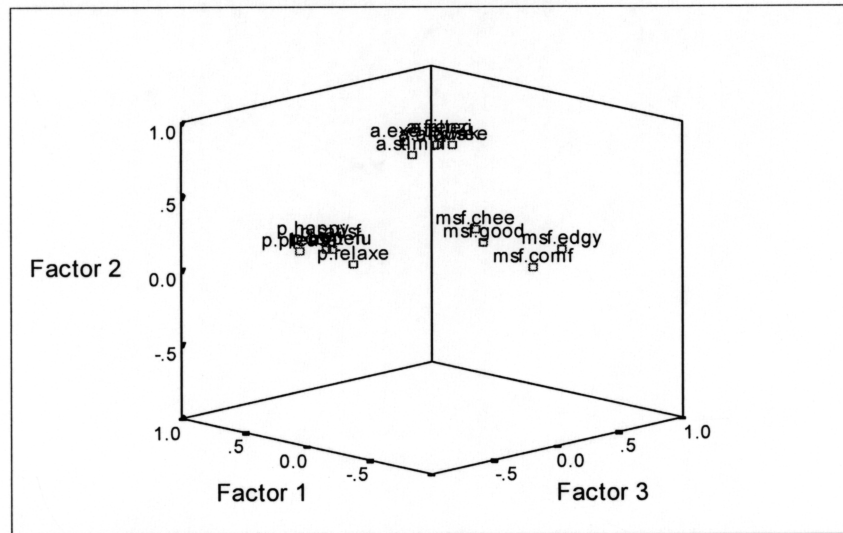


FIGURE VII. FACTOR PLOT OF PLEASURE, AROUSAL, MOOD

Evaluation of Physical Environment

The results of factor loading indicate that since hedonics trumps activation and mood, an unpleasant scent should have a dominant and deleterious effect on environmental evaluations, and perhaps on other shopper responses. Not surprisingly, subjects exposed to the unpleasant scent condition (galbanum) reported significantly lower environmental ratings and perceived times, which were significantly greater percentages of actual time than subjects in the no scent control. Moreover, this difference was found to be significant for both the low and high PDI conditions, not just for subjects in the low PDI treatment as predicted.

Fisher's (1974) Judgment of Environmental Quality scale was used to assess evaluations of the environment, and was found reliable with a Cronbach's alpha of .9401. The mean room evaluation scores ("RM.FISHR") for the eight treatment cells (4 scent conditions and two levels of PDI) are plotted in Figure VIII. The plot illustrates that evaluations of the environment appear to differ across scent treatments more under conditions of low rather than high PDI. Additionally, the unpleasant/arousing scent treatment (galbanum) appears to differ from the other three scent conditions for both the low and high PDI conditions.

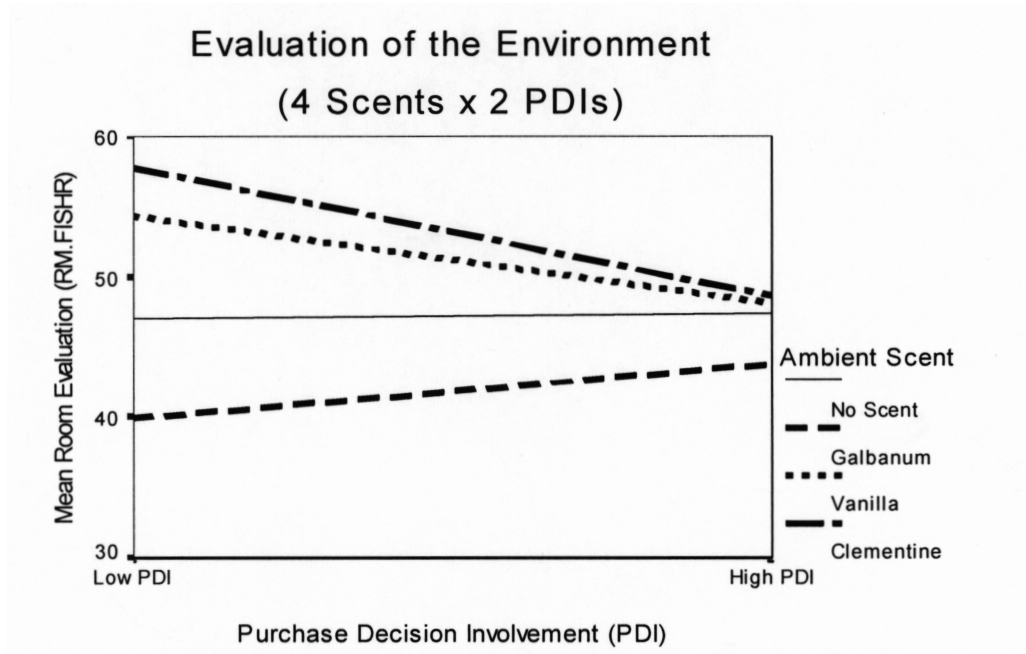


FIGURE VIII. EVALUATION OF THE PHYSICAL ENVIRONMENT

MANOVA analysis confirmed significant differences in the evaluation of the physical environment between scent treatments resulting from an interactive effect between scent and PDI for low but not high PDI. Univariate analysis showed the significance difference existed for all 12 Fisher scale items for low PDI. Only one of the twelve items was significant under high PDI (Room Brightness). Hypotheses testing of scent and PDI on subjects' evaluations of the physical environment was conducted using Bonferroni comparisons of room evaluation (RM.FISHR) between scent treatments to control for Type I experiment-wide error rate. As predicted, significant results were produced under conditions of low PDI only. The results of the Bonferroni comparisons between scent treatments for conditions of Low PDI are presented in Table II.

TABLE II. BONFERRONI MULTIPLE COMPARISONS OF ENVIRONMENTAL EVALUATIONS (RM.FISHR RATINGS OF BETWEEN-SCENT TREATMENTS FOR LOW PDI)

Ambient Scent		Mean Diff. (I-J)	Std. Error	Hypothesis Tested	Sig.	95% Confidence Interval	
(I)	(J)					Lower Bound	Upper Bound
No Scent 47.05	Vanilla 54.29	-7.14	2.950	H4a	.075	-14.91	.42
No Scent 47.05	Clementine 57.74	-10.69*	2.922	H4a	.002	-18.50	-2.87
No Scent 47.05	Pleasant 55.95	-8.90*	2.482	H4a	.001	-14.91	-2.89
Vanilla 54.29	Clementine 57.74	-3.44	2.852	H4b	1.000	-11.07	4.08
No Scent 47.05	Galbanum 39.08	7.97*	2.907	H4c	.041	-.20	15.74

* The mean difference is significant at the .05 level.

An examination of the Bonferroni comparisons under conditions of low PDI in Table II indicates

support for two of the three environmental evaluation hypotheses:

- β H4a: Evaluations of the surrounding environment are higher in the presence of pleasant ambient scents than in the no-experimental scent condition under conditions of low rather than high purchase decision involvement (PDI).

Support for Clementine and Vanilla (Pleasant Scents) combined – significant support Clementine; near support for Vanilla:

Pleasant Scents (55.95) > No Scent (47.05); Fisher mean difference 8.90; $p=.001$

Clementine (57.74) > No Scent (47.05); Fisher mean difference 10.69; $p=.002$

Vanilla (54.29) > No Scent (47.05); Fisher mean difference 7.24; $p=.075$

- β H4b: Evaluations of the surrounding environment are higher in the presence of pleasant/arousing ambient scent than in the presence of pleasant/relaxing scent under conditions of low rather than high PDI.

Not supported: There is no significant difference between the room evaluations of subjects exposed to Clementine and those exposed to Vanilla:

Clementine (57.74) > Vanilla (54.29); Fisher mean difference 3.44; $p=1.000$

- β H4c: Evaluations of the surrounding environment lower in the presence of unpleasant ambient scent than in the no-experimental scent control under conditions of low rather than high PDI.

Supported: Galbanum (39.08) < No Scent (47.05); Fisher mean difference 7.97; $p = .041$

Perceived Time

The between subjects comparison of perceived shopping time vs. actual shopping time provided partial support for only one of the three time perception hypotheses. As expected, subjects exposed to the unpleasant scent condition (galbanum), reported perceived times, which were greater percentages of actual time than subjects in the no scent control. This difference was significant for both PDI conditions, not just for the low PDI treatment as predicted (Figure IX).

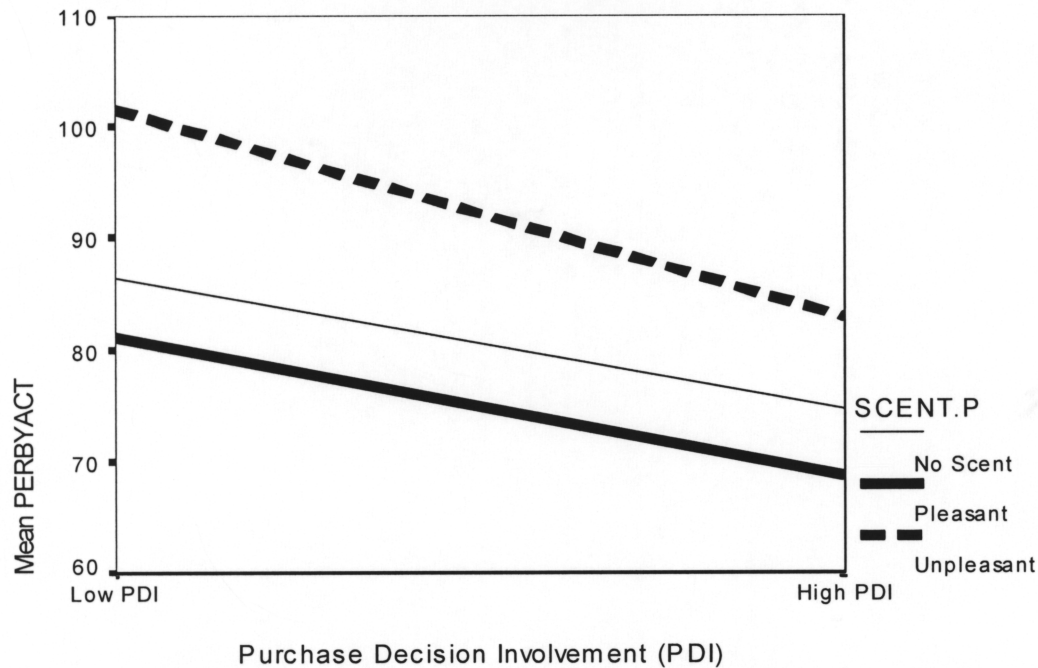


FIGURE IX. PERCEIVED SHOPPING TIME AS A PERCENTAGE OF ACTUAL TIME

Further statistical analysis corroborated the intended manipulation of PDI, degree of odor pleasantness/unpleasantness. Bonferroni comparisons of perceived shopping time as a percentage of actual time revealed that the difference between the unpleasant and the no scent treatments was significant for the low PDI condition only. This perception comparison provides partial support for H8C as originally stated:

- β H5c1: Perceived time is greater than actual time in the presence of unpleasant ambient scent when purchase decision involvement is low rather than high.

Full support is however provided for H8C when restated for the Perceived Time divided by Actual Time percentage (*PerByAct*) comparison:

- β H5c2: Perceived time is a greater percentage of actual time in the presence of unpleasant ambient scent when purchase decision involvement is low rather than high.

Additionally, although not relevant to the three, apriori hypotheses, there was a significant difference between scent treatments for the extreme comparison of unpleasant and pleasant scents. That is, time passed significantly faster for subjects exposed to pleasant scents than for those exposed to unpleasant scents. This perceptual difference held for both low and high PDI.

CONTRIBUTIONS

Calder, Phillips, and Tybout (1981) reported a distinction (in consumer research) between “effects application” and “theory application.” The primary purpose of this scientific investigation is the latter. That is, to advance the status of olfactory research, by expanding the theoretical literature linking feelings and consumer behavior in a simulated and controlled retail environment. The study also does provide managerial guidance for making changes in store

atmosphere based on serious scientific inquiry, rather than on anecdotal accounts often provided in the popular press. The theoretical and managerial implications of the study follow.

Theoretical Contribution

The study adapts a strong theoretical base from environmental psychology to the investigation of the affective state influences on consumptive behavior. The study extends the work of Russell and Pratt (1980) who first adapted Mehrabian and Russell's (1974) Stimulus-Organism-Response (S-O-R) model of environmental psychology to the study of retail atmospherics. Specifically, the current study provides empirical support for incorporating Belk's (1974) situational perspective into Stimulus-Organism-Response (S-O-R) model. The result is a more comprehensive framework for better understanding how situational influences like purchase involvement moderate the influence of scent cues on shopper evaluations and intentions. The study also expands the theoretical knowledge of affective state, by providing a seminal factor analysis test of the relative effects of pleasure, arousal, and mood.

Moderating Role of Situational Involvement

As Belk (1974, 1975) suggested, situational aspects may influence the effect of the environment on the individuals' responses to stimuli within the environment. The current study presented strong evidence that situational involvement was a significant moderator of the relationship between the affective dimensions of ambient scent and induced affective feeling states of pleasure, arousal, and mood, and of affective transfer to shopper evaluations and intentions.

Relative Effects of Pleasure, Arousal, and Mood

The current study provided the first known empirical comparison of the relative effects of pleasure, arousal, and mood. The study corroborated earlier data reduction analysis of pleasure and arousal factors, in which pleasure accounted for the dominant share of factor variation (e.g., Crowley, 1993, Spangenberg et. al., 1996). Additionally, the incorporation of mood yielded a third albeit smaller independent factor, in which all four Mood Short Form (MSF) scale items loaded heavily.

Managerial Implications

Retailers facing an increasingly competitive marketplace are finding it more difficult to differentiate their stores solely based on merchandise, price, promotion, or location. The store itself, however, can offer a unique atmosphere, or environment, that may influence the consumers' patronage decision (Kotler, 1973). **Consumers often interact with the retail environment, and finalize many of their buying decisions at retail point of purchase (Keller, 1987).**

Thus, in-store elements such as lighting, music, color and ambient scent may have more immediate effects on decision making than other marketing inputs not present at point of purchase such as radio, print and television advertising (Baker, 1994). This study offers unique insights for retail merchants on the use of ambient scent stimuli. By considering situational variables and using precise selection of scent stimuli, the proposed model is expected to improve the prediction of atmospheric effects on shopper responses. Additional implications for retailer consideration follow.

Increased Differentiation

It is increasingly difficult for retailers to differentiate based on price, promotion, merchandise, and location. Moreover, store choice may precede brand choice (Darden, 1983), and

atmospherics is a means of attracting customers to the store (Kotler, (1973). Atmospherics is therefore a powerful marketing tool for retailers to differentiate themselves from competitors--if they can understand how to use it (Kotler, 1973). The current study provides empirical evidence that selecting the right scent to differentiate the retailer is more than a matter of simply picking a scent that smells nice. Ambient scents have been shown to differ in their ability to influence shopper evaluations and intentions according to their underlying affective dimensions.

Increased Purchase Opportunities

The current research demonstrated that an ambient scent's underlying affective state dimensions interact with situational involvement to influence both environmental evaluations, and perceived time. Increasingly, many purchase decisions are being made within the store (Keller, 1987)—as many as two-thirds in some industries (Shimp, 1990). Pleasant ambient scent may therefore provide a means of increasing purchase opportunities. Ambient scent may be a particularly useful customer relations tool for retail operations marked by low levels of service and/or social interaction. That is, establishments such as discount stores, self-service catalog showrooms, and vending machine operators may find ambient scent provides a low cost means of enhancing customer attitudes toward their establishments. As Kotler (1973) stated, “atmospherics may even prove to be more influential than the product itself in influencing consumer purchase decisions.” The current study also suggests that retail settings subject to even moderately offensive odors (e.g., pet shops, stores adjacent to sewage treatment plants, paper mills, or even road construction) may wish to consider using pleasant ambient scents as an odor masking technique.

LIMITATIONS & FUTURE RESEARCH

Increasing the Scope of the Model

Designing a mood-inducing setting involves a consideration of the interaction of the setting with consumers' perceptions of other facets of the environment (Gardner, 1985). Kotler and Rath (1984) have de-emphasized the role of individual atmospheric components and have stressed the importance of the overall design of the sponsor's setting, image, and products. Future research designs might for example consider testing the interactive effects of individual atmospheric elements (e.g., the effects of music and scent on mood), and the interaction of overall atmosphere with encounters with store personnel, along with perceptions of store and product image.

Researching Affective Trace Effects

If sufficiently strong, affective traces (informational aspects of the affective response) are retrievable, and a person may “re-experience” some of the same feelings, which had occurred when previously exposed to the stimuli in the store environment. If so, a longer lasting, more highly valenced attitude change toward the store may result. A longitudinal study involving ambient scent effects may increase the application of the proposed model to the study of memory-based effects, which are longer lasting than single instances of affective state induction from exposure to ambient scent. If ambient scent induced affective traces are retrievable, do shoppers re-experience the feelings from previous visits when they re-encounter the scent inside or outside the store? For example, Victoria Secret uses a signature scent, which is a congruent blend of specific aromatic substances precisely released into the atmosphere (Peltier, 1999). If signature scents do lead to a longer lasting, more highly valenced effect, will a Victoria's Secret re-experience her store visit, when she receives a sample of signature scent at home?

Testing in Natural vs. Artificial Laboratory Settings

Laboratory settings offer excellent experimental control of potentially confounding variables, including other ambient factors that may interfere with testing of more subtle scent cues such as scent. Additionally, homogeneous samples used in college settings enhance an experiment's ability to detect differences by increasing the power of the test (Calder, Phillips, & Tybout, 1981), especially for detecting subtle effects from ambient scent (Gulas & Bloch, 1995). The artificial setting and sample homogeneity may, however, detract from the generalizability of the findings to some diverse population segments shown to differ in their scent detection and perception abilities – such as senior citizens (Murphy, Nordin, & Acosta, 1997).

Investigating Bi-Directional and Affiliation Influences of Arousal

Donovan and Rossiter (1982) suggested that inducing arousal might yield increased positive effects only in store environments already deemed pleasant, although the results of the current study suggest otherwise. They also indicated that arousal inducement might yield no influence, or even a negative influence, if induced in already unpleasant store environments. So perhaps introducing a pleasant and arousing Clementine scent, into a dirty and cluttered store will produce unintended negative shopper responses. To date there has been no study to empirically test for the bi-directional effect of arousal in a retail setting. Donovan and Rossiter also postulated an arousal-affiliation relationship that may be of particular interest to retailers with floor personnel. Specifically, they suggested more highly aroused shoppers are more likely to interact with others in the store—including sales personnel. Empirical tests of these arousal hypotheses are needed.

CONCLUSION

The current research extends the olfactory and consumer psychology literature by demonstrating that ambient scents differ in their ability to induce affective feelings, which, in turn are affectively transferred to shoppers evaluations and perceptions of their environment. The research also demonstrated for the first time that this induction and transference is situationally dependent. In support of ELM theory, the study shows that peripheral ambient scent cues influence shopper evaluations, intentions, and perceptions in situations of low rather than high involvement. Finally, the study has important implications for global marketers, suggesting that ambient scent is a potentially powerful tool by which casinos and other retail operators may enhance the evaluations of their store environment, and thereby encourage customers to remain on their premises longer.

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